

US-PAT-NO: 6037734

DOCUMENT-IDENTIFIER: US 6037734 A

TITLE: Motor velocity controlling method employing detection of all side edges of phase signals of an encoder to generate control target values for updating a motor control command

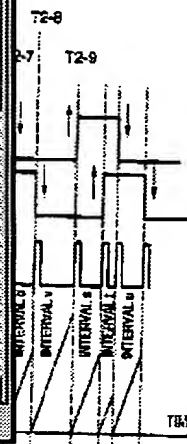
----- KWIC -----

Detailed Description Text - DETX (12):

The image scanner changes the moving speed of the carriage 20 in accordance with the specified resolution decided on PC, and reads out the image.

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62 US 6104864 A

63 US 6065036 A

64 US 6037734 A

65 US 5995137 A

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202	JP 63067863 A	
203	JP 62160469 A	
204	JP 61290880 A	
205	JP 59005236 A	

US-PAT-NO: 5182450

DOCUMENT-IDENTIFIER: US 5182450 A

TITLE: Handheld image scanner with automatic move

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Detailed Description Text - DETX (12):

When movement of the handheld image scanner is automatic control switch (30) is first placed in the ON position, and the switch operated to select the desired degree of resolution. At the same time, the control switch (32) connects the motor (13) to one of the output ports of the divider circuit means (33) to provide to the motor (13) the required voltage corresponding to the desired degree of resolution. Thus, the preferred scanning speed for a desired degree of resolution is obtained when automatically moving the image scanner.

Details Text Image HTML KWIC

108 US 5204736 A

109 US 5202675 A

110 US 5182450 A

111 US 5175570 A

HANDHELD IMAGE SCANNER WITH AUTOMATIC MOVEMENT CONTROL

BACKGROUND OF THE INVENTION

1. Field of the Invention
The invention relates to a handheld image scanner, and more particularly to a handheld image scanner, the scanning movement of which may be manually or automatically controlled.

2. Description of the Related Art
FIG. 1 is a block diagram illustrating an image scanner which is used. Digital data signals from the image scanner (30) are sent to a computer (2) via an interface device (1). The interface device (1) usually employs a direct memory access (DMA) method to receive the digital data signals from the image scanner (30). Data from the interface device (1) is then received by the computer (2) for several display on a monitor device (3) or for storage in a hard disk (4).
Referring to FIG. 2, it is a conventional handheld image scanner (30) is shown to comprise a light source (40) such as a light emitting diode (LED) array or a cold cathode fluorescent lamp, a horizontal line scanning source including a mirror (5) which is rotated at a 45 degree angle and a lens and image sensor (6), a transverse distance measuring means including a roller (7), a transverse distance sensor (8), and a digital generating means including a preferred rotary plate (9) and a photoconductor and timing means (10), a bidirectional control loop (11), and the associated variable resistance, printed circuit board and housing.

When the conventional handheld image scanner (30) is in use, the light source (40) emits light so as to illuminate a portion of an image being scanned. Various light signals are generated according to the different parts on the image. The light signals are transmitted to the roller (5) inside the housing and are deflected towards the lens and image sensor (6) to thereby produce an electric signal which is sent according to the intensity of light signals received. The image sensor has a plurality of light sensitive elements and is capable of scanning at scan rates greater than 100 dots per inch (DPI).

The image sensor can scan only one horizontal line of a predetermined dimension at one time. Then, the handheld image scanner (30) must be moved in a transverse direction so as to scan the succeeding lines.

Referring to FIG. 4, the roller (5) rolls along the surface of the image being scanned when moving the image scanner (30). Rotation of the roller (5) drives the transducer means (8) to successively rotate the rotary plate (9). The rotary plate (9) is formed with a series of radially extending sections. The photoconductor and timing means (10) includes a Colpitts tank circuit, a light emitting means (not shown) mounted on an inner side of the Colpitts tank circuit and a photoconductor (not shown) mounted opposite to the light emitting means. The rotary plate (9) extends into an opening in the Colpitts tank circuit between the light emitting means and the photoconductor. The photoconductor and timing means (10) use this pattern a series of ON/OFF signals whenever the rotary plate (9) is in motion. The ON/OFF signals are received by the computer (2) and are indicative of the spaces covered by the image scanner (30).
Manual movement of the conventional image scanner (30) is a transverse direction relative to the image to be scanned. The following drawbacks

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1. Manually hand movement and digital method movement of the image scanner (30) are easily distinguished in the scanning image transmitted by the lens and image sensor (6).
2. Different degrees of resolution require different scanning speeds. A table of resolution (in dpi) versus the preferred scanning speed (in inch/second) is shown below. Data is obtained under the condition of each dpi being exposed to light for a period of 1/47 milliseconds.

Resolution	10	15	20	25	30	35
Scanning speed	1.2	1.4	1.6	1.8	2.0	2.2

It is difficult to obtain the preferred scanning speed for a desired degree of resolution when movement of the image scanner (30) is manually controlled. Note that high degrees of resolution require low scanning speeds. However, usually hand movement is difficult at rates of such low speeds. Furthermore, no useful information can be obtained when the hand moves at a speed much faster than the preferred scanning speed. 1. When a large volume of scan data is available, the capacity of the computer (2) is immediately filled and further scan data cannot be accommodated in the memory unit. Thus, the memory unit should be first purged via a hard disk so as to permit the computer (2) to receive additional scan data. However, since the manual scanning action is continuously performed, it is possible that some scan data will be lost while the computer (2) transfers data to the hard disk.

SUMMARY OF THE INVENTION

Therefore, the objective of the present invention is to provide an improved handheld image scanner, the movement of which can be automatically controlled so as to overcome the above-mentioned drawbacks commonly associated with the prior art.

More specifically, the main objective of the present invention is to provide a handheld image scanner, the movement of which can be automatically controlled so as to permit transverse movement of the scanner at the preferred scanning speed for a desired degree of resolution, and so as to obviate the adverse effects caused by manually hand movement.

Another objective of the present invention is to provide a handheld image scanner which scans scanning when the memory unit of a computer is full and which resumes scanning only when the memory unit is free to receive more data.

Accordingly, the preferred embodiment of a handheld image scanner of the present invention comprises a housing; a light source mounted to a bottom side of the housing for emitting light to illuminate an image being scanned; a horizontal line scanning means provided inside the housing and including a transducer means to receive light signals which correspond to a transverse dimension line portion of the image. The transducer means generates an electric signal which varies according to the intensity of light signals received; a transducer means also including a roller and a photoconductor and timing means including a rotary plate which rolls along the surface of the image when the image scanner is moved in a transverse movement to the horizontal transverse line portion; a transducer means provided inside the housing and capable of being repeatedly driven by the roller means; and a digital generating means activated by the transducer means so as to generate a series of ON/OFF signals

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